

Non-Patent Documents

Non-Patent Document 1: Benjamin Bross, Woo-Jin Han, Jens-Rainer Ohm, Gary J. Sullivan, Thomas Wiegand, "High efficiency video coding (HEVC) text specification draft 6", JCTVC-H1003 ver21, Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG117th Meeting: Geneva, CH, 21-30 November, 2011

Non-Patent Document 2: Jizheng Xu, "AHG10: Selective inter-layer prediction signalling for HEVC scalable extension", JCTVC-J0239, Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG 16 WP 3 and ISO/IEC JTC 1/SC 29/WG 1110th Meeting: Stockholm, SE, 11-20 July 2012

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0015]

However, in the conventional method, the information for controlling the on/off (on/off) of the prediction process between the layers has been generated and transmitted for every picture. Therefore, there has been a risk that the code amount would increase due to the transmission of the information to thereby deteriorate the encoding efficiency.

[0016]

Embodiments of the present invention suppress the deterioration in encoding efficiency.

SOLUTIONS TO PROBLEMS

[0017]

~~According to a first aspect of the present invention, there is provided an image processing device comprising: a decoding unit that decodes encoded data in which an image with a plurality of layers is encoded by performing the inter-layer prediction on only the sublayer specified by the inter-layer prediction control~~

~~information controlling whether to perform inter-layer prediction, which is prediction between the plurality of layers, using information related to a sublayer.~~

~~— The image processing device may further comprise a reception unit that receives encoded data in which an image with a plurality of main layers is encoded, and inter-layer prediction control information controlling whether to perform inter-layer prediction, which is prediction between the plurality of main layers, with the use of a sublayer.~~

According to a first aspect of the present invention, there is provided an image processing device comprising: a reception unit that receives encoded data in which an image with a plurality of layers is encoded, and inter-layer prediction control information controlling whether to perform inter-layer prediction, which is prediction between the plurality of layers, with the use of information related to a sublayer; and a decoding unit that decodes each layer of the encoded data received by the reception unit by performing the inter-layer prediction on only the sublayer specified by the inter-layer prediction control information received by the reception unit.

[0018]

If a current picture of a current main layer belongs to the sublayer specified as the sublayer for which the inter-layer prediction is performed by the inter-layer prediction control information, the decoding unit may decode the encoded data of the current picture using the inter-layer prediction.

[0019]

The inter-layer prediction control information may specify a highest sublayer for which the inter-layer prediction is allowed; and the decoding unit may decode using the inter-layer prediction, the encoded data of the picture belonging to the sublayers from a lowest sublayer to the highest sublayer specified by the inter-layer prediction control information.

[0020]

The inter-layer prediction control information may be set for each main layer.

[0021]

The inter-layer prediction control information may be set as a parameter common to all the main layers.

[0022]

The reception unit may receive inter-layer pixel prediction control information that controls whether to perform inter-layer pixel prediction, which is pixel prediction between the plurality of main layers, and inter-layer syntax prediction control information that controls whether to perform inter-layer syntax prediction, which is syntax prediction between the plurality of main layers, the inter-layer pixel prediction control information and the inter-layer syntax prediction control information being set independently as the inter-layer prediction control information; and the decoding unit may perform the inter-layer pixel prediction based on the inter-layer pixel prediction control information received by the reception unit, and perform the inter-layer syntax prediction based on the inter-layer syntax prediction control information received by the reception unit.

[0023]

The inter-layer pixel prediction control information may control using the sublayer, whether to perform the inter-layer pixel prediction; the decoding unit may perform the inter-layer pixel prediction on only the sublayer specified by the inter-layer pixel prediction control information; the inter-layer syntax prediction control information may control whether to perform the inter-layer syntax prediction for each picture or slice; and the decoding unit may perform the inter-layer syntax prediction on only the picture or slice specified by the inter-layer syntax prediction control information.

[0024]

The inter-layer pixel prediction control information may be transmitted as a nal unit (nal_unit), a video parameter set (VPS (Video Parameter Set)), or an extension video parameter set (vps_extension).

[0025]

The inter-layer syntax prediction control information may be transmitted as a nal unit (nal_unit), a picture parameter set (PPS (Picture Parameter Set)), or a slice header (SliceHeader).

[0026]

~~According to a second aspect of the present invention, there is provided an image processing method comprising: decoding encoded data in which an image with a plurality of layers is encoded by performing the inter-layer prediction on only the sublayer specified by the inter-layer prediction control information controlling whether to perform inter-layer prediction, which is prediction between the plurality of layers, using information related to a sublayer.~~

According to a second aspect of the present invention, there is provided an image processing method comprising: receiving encoded data in which an image with a plurality of layers is encoded, and inter-layer prediction control information controlling whether to perform inter-layer prediction, which is prediction between the plurality of layers, with the use of information related to a sublayer; and decoding each layer of the received encoded data by performing the inter-layer prediction on only the sublayer specified by the received inter-layer prediction control information.

[0027]

Disclosed herein is an image processing device including: an encoding unit that encodes each main layer of the image data by performing inter-layer prediction, which is prediction between a plurality of main layers, on only a sublayer specified by inter-layer prediction control information that controls whether to perform

the inter-layer prediction with the use of a sublayer; and a transmission unit that transmits encoded data obtained by encoding by the encoding unit, and the inter-layer prediction control information.

[0028]

If a current picture of a current ~~main~~ layer belongs to the sublayer specified as the sublayer for which the inter-layer prediction is performed by the inter-layer prediction control information, the encoding unit may encode the image data of the current picture using the inter-layer prediction.

[0029]

The inter-layer prediction control information may specify a highest sublayer for which the inter-layer prediction is allowed; and the encoding unit may encode using the inter-layer prediction, the image data of the picture belonging to the sublayers from a lowest sublayer to the highest sublayer specified by the inter-layer prediction control information.

[0030]

The inter-layer prediction control information may be set for each ~~main~~ layer.

[0031]

The inter-layer prediction control information may be set as parameters common to all the ~~main~~ layers.

[0032]

The encoding unit may perform inter-layer pixel prediction as pixel prediction between the plurality of ~~main~~ layers based on inter-layer pixel prediction control information that controls whether to perform the inter-layer pixel prediction and that is set as the inter-layer prediction control information; the encoding unit may perform inter-layer syntax prediction as syntax prediction between the plurality of ~~main~~ layers based on inter-layer syntax prediction control information that controls whether to perform the inter-layer syntax prediction and that is set as the inter-layer

prediction control information independently from the inter-layer pixel prediction control information; and the transmission unit may transmit the inter-layer pixel prediction control information and the inter-layer syntax prediction control information that are set independently from each other as the inter-layer prediction control information.

[0033]

The inter-layer pixel prediction control information may control using the sublayer, whether to perform the inter-layer pixel prediction; the encoding unit may perform the inter-layer pixel prediction on only the sublayer specified by the inter-layer pixel prediction control information; the inter-layer syntax prediction control information may control whether to perform the inter-layer syntax prediction for each picture or slice; and the encoding unit may perform the inter-layer syntax prediction on only the picture or slice specified by the inter-layer syntax prediction control information.

[0034]

The transmission unit may transmit the inter-layer pixel prediction control information as a nal unit (nal_unit), a video parameter set (VPS (Video Parameter Set)), or an extension video parameter set (vps_extension).

[0035]

The transmission unit may transmit the inter-layer syntax prediction control information as a nal unit (nal_unit), a picture parameter set (PPS (Picture Parameter Set)), or a slice header (SliceHeader).

[0036]

Disclosed herein is an image processing method including: encoding each ~~main~~ layer of the image data by performing inter-layer prediction, which is prediction between a plurality of ~~main~~ layers, on only a sublayer specified by inter-layer prediction control information that controls whether to perform the inter-layer

prediction with the use of a sublayer; and transmitting encoded data obtained by the encoding, and the inter-layer prediction control information.

[0037]

In an embodiment of the present invention, the encoded data in which the image with the plural ~~main~~ layers is encoded, and the inter-layer prediction control information that controls whether to perform the inter-layer prediction, which is the prediction between the ~~main~~ layers, using the sublayer are received and the inter-layer prediction is performed on just the sublayer specified by the received inter-layer prediction control information; thus, each ~~main~~ layer of the received encoded data is decoded.

[0038]

In another embodiment of the present invention, the inter-layer prediction is performed on just the sublayer specified by the inter-layer prediction control information that controls whether to perform the inter-layer prediction, which is the prediction between the ~~main~~ layers, using the sublayer; thus, each ~~main~~ layer of the image data is encoded and the encoded data obtained by the encoding and the inter-layer prediction control information are transmitted.

EFFECTS OF THE INVENTION

[0039]

According to embodiments of the present invention, the image can be encoded and decoded and particularly, the deterioration in encoding efficiency can be suppressed.

BRIEF DESCRIPTION OF DRAWINGS

CLAIMS

1. An image processing device comprising:

a reception unit that receives encoded data in which an image with a plurality of layers is encoded, and inter-layer prediction control information controlling whether to perform inter-layer prediction, which is prediction between the plurality of layers, with the use of information related to a sublayer; and

a decoding unit that decodes each layer of the encoded data in which an image with a plurality of layers is encoded received by the reception unit by performing the inter-layer prediction on only the sublayer specified by the inter-layer prediction control information received by the reception unit controlling whether to perform inter-layer prediction, which is prediction between the plurality of layers, using information related to a sublayer.

~~2. The image processing device according to claim 1, further comprising a reception unit that receives encoded data in which an image with a plurality of main layers is encoded, and inter-layer prediction control information controlling whether to perform inter-layer prediction, which is prediction between the plurality of main layers, with the use of a sublayer.~~

32. The image processing device according to claim 21, wherein if a current picture of a current main layer belongs to the sublayer specified as the sublayer for which the inter-layer prediction is performed by the inter-layer prediction control information, the decoding unit decodes the encoded data of the current picture using the inter-layer prediction.

43. The image processing device according to claim 32, wherein the inter-layer prediction control information specifies a highest sublayer for which the inter-layer prediction is allowed, and

the decoding unit decodes using the inter-layer prediction, the encoded data of the picture belonging to the sublayers from a lowest sublayer to the highest sublayer specified by the inter-layer prediction control information.

54. The image processing device according to claim 1, wherein the inter-layer prediction control information is set for each main layer.

65. The image processing device according to claim 1, wherein the inter-layer prediction control information is set as a parameter common to all the main layers.

76. The image processing device according to claim 1, wherein the reception unit receives inter-layer pixel prediction control information that controls whether to perform inter-layer pixel prediction, which is pixel prediction between the plurality of main layers, and inter-layer syntax prediction control information that controls whether to perform inter-layer syntax prediction, which is syntax prediction between the plurality of main layers, the inter-layer pixel prediction control information and the inter-layer syntax prediction control information being set independently as the inter-layer prediction control information, and

the decoding unit performs the inter-layer pixel prediction based on the inter-layer pixel prediction control information received by the reception unit, and performs the inter-layer syntax prediction based on the inter-layer syntax prediction control information received by the reception unit.

87. The image processing device according to claim 76, wherein the inter-layer pixel prediction control information controls using the sublayer, whether to perform the inter-layer pixel prediction,

the decoding unit performs the inter-layer pixel prediction on only the sublayer specified by the inter-layer pixel prediction control information,

the inter-layer syntax prediction control information controls whether to perform the inter-layer syntax prediction for each picture or slice, and

the decoding unit performs the inter-layer syntax prediction on only the picture or slice specified by the inter-layer syntax prediction control information.

98. The image processing device according to claim 87, wherein the inter-layer pixel prediction control information is ~~received~~ transmitted as a nal unit (nal_unit), a video parameter set (VPS (Video Parameter Set)), or an extension video parameter set (vps_extension).

109. The image processing device according to claim 87, wherein the inter-layer syntax prediction control information is ~~received~~ transmitted as a nal unit (nal_unit), a picture parameter set (PPS (Picture Parameter Set)), or a slice header (SliceHeader).

110. An image processing method comprising:

receiving encoded data in which an image with a plurality of layers is encoded, and inter-layer prediction control information controlling whether to perform inter-layer prediction, which is prediction between the plurality of layers, with the use of information related to a sublayer; and

decoding each layer of the received encoded data ~~in which an image with a plurality of layers is encoded~~ by performing the inter-layer prediction on only the sublayer specified by the received inter-layer prediction control information ~~controlling whether to perform inter-layer prediction, which is prediction between the plurality of layers, using information related to a sublayer.~~